

PATENT COOPERATION TREATY


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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference MP100622-WO		FOR FURTHER ACTION See Form PCT/PEA/416	
International application No. PCT/GB2004/003381	International filing date (day/month/year) 05.08.2004	Priority date (day/month/year) 05.08.2003	
International Patent Classification (IPC) or national classification and IPC D04B15/48			
Applicant UNIVERSITY OF MANCHESTER			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau a total of 5 sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input checked="" type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input checked="" type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
Date of submission of the demand 04.03.2005		Date of completion of this report 08.11.2005	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized Officer Uhlig, R Telephone No. +49 89 2399-7083	



**INTERNATIONAL PRELIMINARY REPORT
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Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

1-26 as originally filed

Claims, Numbers

1-12 received on 11.04.2005 with letter of 07.04.2005
13-27 filed with telefax on 19.09.2005

Drawings, Sheets

1/7-7/7 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing *(specify):*
 - ☐ any table(s) related to sequence listing *(specify):*
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing *(specify):*
 - ☐ any table(s) related to sequence listing *(specify):*

* If item 4 applies, some or all of these sheets may be marked "superseded."

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Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application,

☒ claims Nos. 8-11, 14, 20-22, 25

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☒ no international search report has been established for the said claims Nos. 8-11, 14, 20-22, 25

☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:

the written form ☐ has not been furnished

☐ does not comply with the standard

the computer readable form ☐ has not been furnished

☐ does not comply with the standard

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.

☐ See separate sheet for further details

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-7, 12, 13, 15-19, 23, 24, 26, 27
	No: Claims	
Inventive step (IS)	Yes: Claims	1-7, 12, 13, 15-19, 23, 24, 26, 27
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-7, 12, 13, 15-19, 23, 24, 26, 27
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

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1. References

Reference is made to the following document cited in the international search report:
D1: US-A-3 327 499

RE Item V

2. Independent Claim 1

2.1 Based on the documents mentioned in the search report, the subject-matter of claim 1 appears to be new and inventive according to Articles 33 (1) and 33 (3) PCT.

2.2 Document D1, col. 3, li. 35-39; claim 1; col. 5, li. 5-10; Fig. 1 & col. 5, li. 31-41 & col. 5, li. 67 - col. 6, li. 5 appears to disclose the preamble of claim 1.

2.3 The subject-matter of claim 1 differs by the characterizing portion of claim 1.

2.4 The objective problem to be solved by this distinguishing feature may therefore be regarded as reliably feeding yarn at a constant tension for all kinds of knitting patterns.

2.5 None of the cited prior art documents disclose the characterizing features. With the features of the characterizing portion a closed loop control is provided.

2.6 Consequently claim 1 fulfills the requirements according to Articles 33 (1), 33 (2) and 33 (3) PCT, as the solution of the present problem provided by claim 1 is not obvious.

3. Independent Claim 16

3.1 Based on the documents mentioned in the search report, the subject-matter of claim 16 appears to be new and inventive according to Articles 33 (1) and 33 (3) PCT.

3.2 The line of argument provided for apparatus claim 1 analogously applies to method claim 16.

4. Dependent Claims 2-7, 12, 13, 15, 17-19, 23, 26, 27

The dependent claims 2-7, 12, 13, 15, 17-19, 23, 26, 27 are regarded - from a formalistic point of view - as being new and inventive, as they refer directly or indirectly to independent claims 1 or 16 which are considered to be new and inventive.

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RE Item VII

7. Formal/Further Objections

- 7.1 The applicant has changed the dependency at least of claim 24. No basis in the application as originally filed for this amendment is provided and consequently the examiner cannot verify whether this amendment introduces subject-matter which extends beyond the content of the application as filed, contrary to Article 34(2)(b) PCT.
- 7.2 The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).
- 7.3 The document D1, which is considered to be the most relevant prior art document, is not identified in the description and its relevant contents is not indicated as required by Rule 5.1(a)(ii) PCT.
- 7.4 The application does not comply with the requirements of Article 5 PCT in combination with the PCT Guidelines 4.26 as neither the relevant matter of the cited documents introduced in the description with the phrase "incorporated herein by reference" is expressly incorporated into the description and the phrase "incorporated herein by reference" is deleted nor is said phrase just deleted.
- 7.5 The description is not adapted to the set of claims.

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CLAIMS

1. A knitting machine comprising at least one knitting needle; at least one positive yarn feed device for feeding yarn to said at least one knitting needle; needle
5 monitoring means for providing information relating to the at least one knitting needle during the course of a knitting operation; and a controller for controlling the operation of the positive yarn feed device
- CHARACTERISED IN THAT
- 10 the needle monitoring means are adapted to provide needle selection data, the controller being adapted to receive such data from the needle monitoring means during the course of a knitting operation; use said data to calculate a desired amount of yarn to be fed to a knitting needle; and control the positive yarn feed device to feed the desired amount of yarn to the knitting needle during the course of the knitting operation.
- 15 2. A knitting machine according to claim 1 in which the positive yarn feed device comprises a servomotor which is controlled by the controller.
3. A knitting machine according to claim 1 or claim 2 further comprising at least one stitch cam, in which the operation of the stitch cam is controlled by the controller
20 during the course of a knitting operation.
4. A knitting machine according to claim 3 including a stitch cam motor for varying the position of said stitch cam, and the operation of the stitch cam motor is controlled by the controller during the course of a knitting operation.
- 25 5. A knitting machine according to claim 4 in which the stitch cam motor comprises a stepper motor.

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6. A knitting machine according to claim 4 in which the stitch cam motor comprises a servomotor.

5 7. A knitting machine according to any of claims 3 to 6 in which the controller controls the operation of the stitch cam so as to produce knitted loops of predetermined characteristics, preferably a predetermined stitch length.

10 8. A knitting machine according to any preceding claim including fabric take down means, in which the operation of the fabric take down means is controlled by the controller during the course of a knitting operation.

9. A knitting machine according to claim 8 in which the fabric take down means comprises a fabric take down motor, and the operation of the fabric take down motor is controlled by the controller during the course of a knitting operation.

15 10. A knitting machine according to claim 9 in which the fabric take down motor comprises a servomotor.

20 11. A knitting machine according to any of claims 8 to 10 in which the controller controls the operation of the fabric take down means in accordance with the stitch length employed by the knitting machine.

25 12. A knitting machine according to any preceding claim further comprising tension measuring means for measuring the tension of yarn fed to the at least one knitting needle; in which the yarn tension measured by the tension measuring means is communicated to the controller, and the controller utilises the measured yarn tension to control the knitting operation.

13. A knitting machine according to claim 12 when dependent on any one of claims 3 to 7 in which the controller controls the operation of the stitch cam in accordance with the yarn tension measured by the tension measuring means.

14. A knitting machine according to claim 12 or claim 13 when dependent on any one of claims 8 to 11 in which the controller controls the operation of the fabric take down means in accordance with the yarn tension measured by the tension measuring means.

15. A flat-bed knitting machine according to any preceding claim.

16. A method comprising knitting a knitted structure with at least one yarn whilst supplying an amount of said yarn to at least one knitting needle using at least one positive yarn feed device; and monitoring operation of the at least one needle to provide information relating thereto during the course of knitting

CHARACTERISED IN THAT

the information provided is needle selection data which is used to calculate a desired amount of yarn to be fed to a knitting needle; and the positive yarn feed device is controlled to feed the desired amount of yarn to the knitting needle during the course of the knitting.

17. A method according to claim 16 including the step of controlling the operation of a stitch cam during the course of the knitting.

18. A method according to claim 17 including the step of varying the position of the stitch cam by controlling the operation of a stitch cam motor.

19. A method according to claim 17 or claim 18 in which the operation of the stitch cam is controlled so as to produce knitted loops of predetermined characteristics, preferably a predetermined stitch length.
20. A method according to any of claims 17 to 19 including the step of controlling the operation of fabric take down means during the course of the knitting.
21. A method according to claim 20 in which the step of controlling the fabric take down means comprises controlling the operation of a fabric take down motor.
22. A method according to claim 20 or claim 21 in which the operation of the fabric take down means is controlled in accordance with the stitch length employed during the knitting.
23. A method according to any of claims 16 to 22 including the step of measuring the tension of yarn fed to the at least one knitting needle, and wherein the measured yarn tension is utilised to control the knitting.
24. A method according to claim 17 and claim 23 in which the operation of the stitch cam is controlled in accordance with the measured yarn tension.
25. A method according to claim 20 and claim 23 in which the operation of the fabric take down means is controlled in accordance with the measured yarn tension.
26. A method according to any of claims 16 to 25 in which the stitch length is varied.

